**Mystery Powders – Teacher Notes**

**OVERVIEW**

This activity provides the students with the opportunity to perform six tests on a variety of unknown white powders. Through these tests the students will learn how to determine the composition of each unknown. The chemical detection lab is a good example of an activity that can be done at many different grades in a science class. The difference at each grade is the context. For example, in elementary school a class may focus on observing the powders to determine the differences in the powders whereas at a middle or junior school a class may focus on classifying the powders by the reactions that occurred. In this forensic lesson the intent of activity is to show students how unknown samples could be identified.

**STUDENT ACTIVITY NOTES**

**Part 1 - Determining the Characteristics of Various White Powders**

In Part 1 the students learn how to do a series of tests on five powders. By determining what a positive test for the powder is, they will be able to determine the composition of an unknown powder that may contain more than one type of white powder. The table below shows the positive test for each of the powders (NR - means no recordable reaction)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Microscope/Lens Observation | Heat | Vinegar | Iodine | water |
| Salt | White Crystals | NR | NR | NR | Dissolves |
| Sugar | NR | Turns brown | NR | NR | NR |
| Starch | NR | NR | NR | Black | NR |
| Baking Soda | NR | NR | Bubbles | NR | NR |
| Plaster | Powder | NR | NR | NR | Does not dissolve |

**Part 2 - Identify an Unknown Mixture of White Powders**

Students are to be supplied with a combination of two or three white powders mixed together. You will need a key to keep track of which student has what unknown mixture. The emphasis in this section is having the students correctly perform the tests and record the data in an appropriate manner that allows them to draw conclusions that can be supported by their data. An alternative would be to allow each group to create their own mixture of two or three powders, trade with another group, and try to solve another group’s unknown mixture.

**MATERIALS**

The list of materials below is in order of tests the students will perform:

* Samples of five white powders: salt, sugar, starch, baking soda, and plaster of Paris
* black paper
* hand lens or microscope
* tinfoil
* hotplate
* spot plate or small containers such as an egg carton or ice cube tray
* vinegar, iodine, water
* droppers